

ABSTRACT OF THE DISCLOSURE

A reinforced solder bump connector structure is formed between a contact pad arranged on a semiconductor chip and a ball pad arranged on a mounting substrate. The semiconductor chip includes at least one reinforcing protrusion extending upwardly from a surface of an intermediate layer. The mounting substrate includes at least one reinforcing protrusion extending upwardly from a ball pad, the protrusions from both the chip and the substrate being embedded within the solder bump connector. In some configurations, the reinforcing protrusions from the contact pad and the ball pad are sized and arranged to have overlapping upper portions. These overlapping portions may assume a wide variety of configurations that allow the protrusions to overlap without contacting each other including pin arrays and combinations of surrounding and surrounded elements. In each configuration, the reinforcing protrusions will tend to suppress crack formation and/or crack propagation thereby improving reliability.